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# Bicolor and Yellow Supersweet Corn Trials 1999-2001

BY DAVID E. HILL

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## SUMMARY


In 1999, 14 cultivars of bicolor supersweet corn were tested for cool soil germination in two late-April plantings using slit clear plastic mulch and Reemay row covers to warm the soil. In June 1999, six of these cultivars were tested for yield and ear characteristics. In June 2000, the remaining eight bicolor cultivars were tested for yield and ear characteristics. In April and June 2001, six cultivars of yellow supersweet corn were tested for cool soil germination, yield, and ear characteristics. The tests were conducted at Windsor on a sandy terrace soil (Merrimac sandy loam) and at Mt. Carmel on a loamy upland soil (Cheshire fine sandy loam).

In April 1999, germination tests at Windsor on clear plastic mulch and Reemay row covers increased average germination of 14 bicolor cultivars 13% and 8%, respectively, compared to uncovered controls. At Mt. Carmel, average germination of 14 bicolor cultivars was increased 28% under clear plastic mulch and 13% under Reemay row covers compared to uncovered controls.

In April 2001, unslit clear plastic mulch decreased average germination of six yellow cultivars 13% while Reemay row covers increased average germination 4% compared to uncovered controls. Decreased germination under unslit clear plastic mulch was due to build-up of excess heat beneath the plastic covers.

Among the 14 bicolor cultivars, Majesty and Milk & Honey were best suited for late-April plantings under both covers while Phenomenal, Seneca Appaloosa, and Fantasy germinated well under clear plastic mulch. Germination of Majesty exceeded 90% under both covers at both sites and was deemed best suited for germination in cool soil. Among the six yellow cultivars, Extra Tender 275A, Summer Sweet 6800, and Sweetie germinated best under both covers.

In tests for ear characteristics, bicolor Amazingly Sweet had the heaviest ears (10.7 ounces) due to the greatest median number of rows of kernels (18). Bicolor Seneca Appaloosa (1.8) and Majesty (1.5) had the greatest number of ears/plant. Among yellow cultivars, Early Illini Xtra Sweet, Krispy King, and Summer Sweet 6800 had the heaviest ears (9.7 ounces). Their length was above average (7.6 inches) and their median number of rows of kernels was above average (16-18).

In June plantings, total yields of bicolor cultivars Majesty, Seneca Appaloosa, Candy Store, Odyssey, Quest, and Fortune exceeded 21,000 marketable ears/acre. Total yields of yellow cultivars Fortune, Early Illini Xtra Sweet, Sweetie, and Summer Sweet 6800 exceeded 20,000 marketable ears/acre.

Net profits were determined for all bicolor and yellow cultivars grown under clear plastic mulch and Reemay row covers. At a retail price of $3.00/dozen ears for early corn, the greatest net profit was bicolor cultivar Majesty ($6,695/acre) in uncovered controls. Net profit, exceeding $5,000/acre, was also noted in Phenomenal and Seneca Appaloosa under uncovered controls. Net profit in Majesty under Reemay row covers and Phenomenal under clear plastic mulch also exceeded $5,000/acre. For yellow cultivars, net profit was greatest in four of six cultivars in uncovered controls. Although some yields of yellow cultivars were greater under either cover, they were insufficient to offset the cost of the cover materials. The net profit of Fortune and Sweetie, grown without cover, exceeded $5,700/acre. At a wholesale price of $1.50/dozen ears, seven of 14 bicolor cultivars incurred net losses when grown under either cover. Majesty had the greatest net profit ($3,035/acre) when grown without cover.

# Bicolor and Yellow Supersweet Corn trials 1999-2001

BY DAVID E. HILL

Sweet corn, a vegetable staple throughout the year, has its roots in antiquity. Archeological evidence attests to its earliest use 5400-7200 years ago in southern Mexico (Yamaguchi 1983). The earliest corn, referred to as Indian corn or maize, was starchy and the dried kernels were ground for food. Sweet corn, a mutation of field corn, was grown by Indians and adopted by pioneers late in the 18th Century (Splittstoesser 1979). Geneticists have developed more than 2,000 hybrids to improve the appearance and eating quality of the ear. More recent efforts have been directed to improve resistance to such diseases as Stewart's wilt, northern and southern corn leaf blight, and rust. Most recently, new varieties have been genetically enhanced to protect the ears from European corn borers, corn ear worms, and fall army worms. Although these new varieties containing the *Bt* protein have not gained wide public acceptance, its greatest benefit is reducing the amount of pesticides needed to produce a marketable pest-free crop.

There are three genetic categories of sweet corn. The normal sugary varieties (su) have a total sugar content in the endosperm less than 10%, the sugar enhanced varieties (se) about 18%, and the supersweet varieties (sh2) more than 30% (Laughnan 1953). The supersweet varieties not only have a high sugar content, but also the conversion of sugar to starch after full maturity is retarded (Creech 1965). These two factors enable harvested supersweet corn to retain sweetness at least 10 days under refrigeration. In normal sugary types, the sugar is mostly converted to starch in 2 or 3 days.

Southern sweet corn growers have benefited from the development of supersweet corn because they can now ship their corn to distant markets without significant loss of sweetness and flavor. For northern growers and their customers, the benefits are obvious. The greatest sugar content occurs about 24 days after the silk has emerged in about half the plants (Creech 1965). After 24 days, the harvest window for the grower is broader than for normal corn. If harvest occurs when the sugar content is highest, the grower or consumer can store refrigerated ears up to 7-10 days and maintain sweetness.

The varieties of supersweet corn that were first developed and released in the 1960s and 1970s had several defects that adversely affected yield and quality (Wong et al. 1994). Tough pericarps surrounding the endosperm produced kernels that were difficult to chew. Incomplete coverage by the husks resulted in unsightly exposed ear tips. Seed vigor was poor in cool soil at the expense of stand density. Planting had to be delayed until the soil warmed to 60-65F. Most of the early deficiencies have been corrected in new cultivars.

*Current outlook.* Among all vegetables grown in Connecticut, sweet corn ranks first in acres grown and cash value. According to the New England Agricultural Statistics Service, Connecticut growers harvested 4,600 acres of sweet corn in 2001 that was valued at 6.2 million dollars (Anon 2002).

Much of the sweet corn produced in Connecticut is sold through roadside markets. An enterprise budget, developed by Bravo-Ureta (1985) estimated a net return of $1,038/acre for early corn based on a conservative harvest of 1,000 dozen ears/acre. This budget did not include expenditures for plastic mulch or row covers.

Our trials of supersweet corn began in 1995. Six cultivars each of bicolor, yellow, and white varieties were selected for the initial study and were reported earlier (Hill 1997, 1998, 2000). These 18 cultivars, represented only a small fraction of supersweet cultivars available from domestic seedsmen. The cast of supersweet characters is constantly changing. Among the 18 cultivars initially tested, four were replaced by others within 2 years. In 1999, testing began on 14 more bicolors and six more yellows. In this bulletin, I report the yield and quality of cultivars grown at Windsor (1999-2001) and Mt. Carmel (1999 only). I also report the results of germination tests in cool soil of all 20 cultivars in three April plantings. Finally, I discuss strategies to maximize yield and profit through cultivar selection and the use of clear plastic mulch or Reemay row covers to allow early planting and harvest when prices are highest.

Table 1. Departure from normal rainfall (inches) during the 1999-2001 growing seasons (April-October) at Windsor and Mt. Carmel.

| | Windsor 30-Year Avg. | 1999 | 2000 | 2001 | Mt. Carmel 30-Year Avg. | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|
| April | 3.9 | -2.7 | 1.6 | -2.6 | 4.0 | -2.1 | 1.5 | -2.2 |
| May | 3.4 | -1.0 | 1.4 | 0.6 | 3.7 | -0.2 | 0.8 | 2.6 |
| June | 3.2 | -2.8 | 3.2 | 2.5 | 2.5 | -2.0 | 4.3 | 2.5 |
| July | 2.6 | 1.4 | 2.8 | -1.5 | 3.2 | -2.1 | 4.7 | -1.4 |
| August | 3.4 | -0.7 | -1.1 | 1.0 | 3.9 | -1.8 | 0.4 | 0.8 |
| September | 3.4 | 8.5 | 1.0 | 0.3 | 4.2 | 5.5 | 0.2 | -0.9 |
| October | 3.0 | 0.3 | -2.1 | -2.3 | 3.3 | 2.1 | -2.5 | -1.4 |

## SOILS AND RAINFALL

*Soils.* All supersweet corn trials were conducted at the Valley Laboratory, Windsor on Merrimac sandy loam, a well-drained terrace soil with somewhat limited moisture holding capacity and at Lockwood Farm, Mt. Carmel (Hamden) on Cheshire fine sandy loam, a well-drained upland soil with moderate moisture holding capacity.

*Rainfall.* Rainfall distribution throughout the growing season (April-October) for 1999-2001 is shown in Table 1. Rainfall in each column represents the departure from the mean monthly rainfall for Hartford (near Windsor) and Mt. Carmel reported by the National Weather Service. Total rainfall at Windsor during the 1999, 2000, and 2001 growing seasons was 25.7, 29.8, and 20.9 inches, respectively, compared to a 30-year average of 22.9 inches. Total rainfall at Mt. Carmel during the same period was 24.2, 32.7, and 24.8 inches, respectively, compared to a 30-year average of 25.0 inches.

In 1999 at Windsor, total rainfall throughout the growing season was 2.8 inches above normal, but up to 2.8-inch deficits occurred from April through June and August. Rainfall, totaling 11.3 inches in September, nullified the deficits and gave the appearance of normalcy. At Mt. Carmel, cumulative rainfall deficits, totaling 8.3 inches from April through August, created prolonged drought, especially in July and August, when only 3.2 inches of rain fell. Severe drought and high temperatures severely stunted the growth of most crops and sharply reduced yields. During September and October, 15.1 inches of rain was too late to impact yields.

In 2000 at Windsor, rainfall during the growing season was 6.9 inches above normal. Most of the excess occurred between April and July when 22.9 inches of rain fell, accompanied by lower-than-average temperatures. August and October had deficits of 1.1 to 1.2 inches, respectively. At Mt. Carmel, rainfall throughout the growing season was 7.8 inches above average with 24.8 inches falling between April and July. Rainfall deficits occurred in August and October. Contrary to extremely dry 1999, the 2000 growing season was characterized by abundant water for excellent crop growth and yields at both sites.

In 2001 at Windsor, rainfall during the growing season was 2.0 inches below average. Deficits occurred in April (-2.6 inches), July (-1.5 inches), and October (-2.3 inches). The driest period was April 14 to May 11, with only 0.1 inches of rain. Two irrigations were required to maintain growth of the young corn plants. At Mt. Carmel, total rainfall throughout the growing season was 24.8 inches compared to a 30-year average of 25.0 inches. Although total rainfall for the growing season appears normal, deficits occurred in April (-2.2 inches), July (-1.4 inches), September (-0.9 inches), and October (-1.4 inches). One irrigation was required in July.

## METHODS AND MATERIALS

*Cultivars.* In 1999, 14 cultivars of bicolor supersweet corn were tested for cool soil germination, and six of these were tested for yield and ear characteristics. In 2000, the remaining eight bicolor cultivars were tested for yield and ear characteristics. In 2001, six cultivars of yellow supersweet corn were tested for cool soil germination, yield and ear characteristics. All cultivars (Table 2) were obtained from several domestic seedsmen.

*Cool soil germination tests.* In 1999, to determine tolerance for germination in cool soil, 14 cultivars of bicolor supersweet corn were planted in a split block design at both sites in two plantings (April 20-21 and April 28-29) at both sites. In each planting, the rows, 66 feet long, were spaced

Table 2. Supersweet cultivars tested for cool soil germination, yield and ear characteristics during 1999-2001. Catalogue maturities are also listed.

| Bicolor | Maturity |
|---|---|
| Amazingly Sweet | (82) |
| Candy Store | (80) |
| Diabolo | (78) |
| Fantasy | (75) |
| Fortune | (75) |
| Honey & Pearl | (78) |
| Jumpstart | (70) |
| Majesty | (75) |
| Milk & Honey | (71) |
| Odyssey | (80) |
| Phenomenal | (85) |
| Quest | (80) |
| Seneca Appaloosa | (73) |
| Twice as Nice | (78) |
| **YELLOW** | **MATURITY** |
| Early Illini Xtra Sweet | (78) |
| Extra Tender 275A | (75) |
| Fortune | (73) |
| Krispy King | (78) |
| Summer Sweet 6800 | (72) |
| Sweetie | (82) |

3 feet apart. Each row was divided into 20-foot segments forming three 20 x 33-foot blocks, each separated by a 3-foot aisle. Seeds of each cultivar were planted at 10-inch intervals within rows. After planting, one block was covered with strips of 1.1 mil slit clear polyethylene film and another block was covered with Reemay spun-bonded polyester row covers. The remaining block was uncovered. All covers were pinned to the soil with 6-inch wide heavy-duty staples whose prongs penetrated the soil 5 inches. In successive plantings, the treatments were randomly placed. In the first planting, both covers were removed after 24 days. In the second planting, wind-whipped slit plastic mulch was removed after 16 days to avoid injury to the newly-emerging seedlings. The Reemay row covers were removed after 23 days. Seedling counts were made after removal of the covers.

In 2001, cool soil germination tests were made on six cultivars of yellow supersweet corn at Windsor. Plot design was similar to 1999. Clear plastic mulch and Reemay row covers were laid on April 26, immediately after the seeds were planted. The clear plastic mulch was not pre-slit. On May 28, 12 days after planting, the newly emerging seedlings were under stress because of the build-up of heat under the plastic. The plastic was slit by hand to allow the heat to escape. Both covers were removed on May 14, and seedling counts were compared to counts on the uncovered control. Germination totals included seedlings that did not survive the excess heat.

*Cultivar evaluation.* On June 30, 1999, six cultivars of bicolor supersweet corn (Jumpstart, Majesty, Milk & Honey, Seneca Appaloosa, Phenomenal, and Amazingly Sweet) were planted at both sites. On June 23, 2000, four bicolor cultivars (Candy Store, Odyssey, Quest, and Twice as Nice) were planted at both sites. On July 7, 2000, the remaining bicolor cultivars (Diabolo, Fortune, Honey & Pearl, and Ivory & Gold) were planted at both sites. Data from plantings at Mt. Carmel were compromised by severe raccoon damage in 1999 and 2000. On June 26, 2001, six cultivars of yellow supersweet corn (Early Illini Xtra Sweet, Extra Tender 275A, Fortune, Krispy King, Summer Sweet 6800, and Sweetie) were planted at Windsor only. Each planting consisted of four to six 12 x 12-foot randomized blocks in four replications. Each block, surrounded by a 3-foot aisle, consisted of four rows of a single cultivar spaced 3 feet apart. Seeds were planted 10 inches apart within rows, producing a potential density of 60 plants/block.

*Weed control.* A pre-emergence application of Bullet (alachlor + atrazine at 3qt./acre) was applied to all germination and cultivar evaluation plots. In the germination trials, Bullet was applied immediately after planting. The clear plastic mulch and Reemay row covers were laid after a 2-day reentry period.

*Insect control.* Corn ear worms and European corn borers were controlled with Asana XL (esfenvalerate at 9.6 oz./acre) in the pre-tassel stage.

*Harvesting and grading.* Ears were harvested when they reached full maturity (milk stage). Ten ears were randomly picked from the center two rows of each four-row block to determine the average weight and length of ears and the number of rows of kernels. The ears were graded for quality and uniformity. Grading of ears relied on visual evaluation, i.e. straightness of the ear and rows of kernels, and completeness of the rows. Poor tip fill, base fill, and incomplete rows of kernels are evidence of incomplete pollination, which may be due to local weather conditions when pollination occurs. High winds blowing across the rows may cause incomplete transfer of pollen from tassel to silk (Splittstoesser 1979). Poor pollination may also occur if the plants are under moisture stress (Yamaguchi 1983). All ears were graded as follows:

Grade 1. Marketable ears, greater than 6 inches, with straight rows from tip to base and no internal skips within the rows or disappearance of rows along the axis of the ear.

Grade 2. Marketable ears, greater than 6 inches, with occasional skips along the rows and rows that terminate along the axis. Also included are ears with incomplete tip or base fill less than 1 inch from the base or tip or rows that are slightly skewed along the axis.

Grade 3. Unmarketable ears, less than 6 inches long,

whose incomplete tip or base fill exceeds 1 inch or with rows that are incomplete or highly skewed along the axis.

## COOL SOIL GERMINATION TESTS

In the past, germination of supersweet corn was reported to be poor in cool soil, a characteristic that concerned many northern growers. Although many new cultivars offer improved vigor, seedsmen continue to suggest that planting should be delayed until soil temperatures rise above 60-65F to insure satisfactory germination.

Let us now examine the effect of row covers and plastic mulch on soil temperature, days to germination, germination percent, and days to maturity.

*Soil temperature.* For early supersweet corn plantings, soil temperature in the vicinity of the planted seed (0.75-1.0 inch depth) can be increased with slit clear plastic mulch or Reemay row covers (Hill 1997). In late-April plantings, soil temperature under slit clear plastic mulch increased 8-14F compared to bare soil. Reemay row covers increased soil temperature 5-9F compared to bare soil (Hill 2000). Their effect on soil temperature diminished in early May as the maximum daily air temperature increased to 88F in mid-May.

Clear plastic mulch and Reemay row covers not only increased soil temperatures, they can also protect newly-emerging seedlings 2-3F below freezing (Ferro et al. 1997). No freezing temperatures occurred in 1999-2001 after the plots were covered.

*Days to germination.* Clear plastic mulch was shown to shorten the average days to germination 7 days at both sites while Reemay row covers shortened the average days to germination 6 days compared to uncovered controls (Hill 2000). Early-maturing cultivars were first to emerge and late-maturing cultivars were last to germinate.

*Germination percent.* In 1999 at Windsor, clear plastic mulch increased average germination of 14 cultivars of bicolor supersweet corn in April 21 and April 29 plantings 11% and 14%, respectively, compared to uncovered controls (Table 3). Reemay row covers increased average germination 7% and 8%, respectively compared to uncovered controls.

In 1999 at Mt. Carmel, clear plastic mulch increased average germination in April 21 and April 29 plantings 27% and 29%, respectively while Reemay row covers increased average germination 21% and 5%, respectively, compared to uncovered controls.

In 2001 at Windsor, clear plastic mulch decreased average germination in six yellow supersweet cultivars 13% compared to the uncovered control while Reemay row covers increased average germination 4% compared to uncovered controls. The clear plastic was not pre-slit as it was in 1999, and the decrease was attributed to the build-up of heat under the plastic cover. The newly emerging roots shriveled before some of the seedlings emerged. The apparent lack of success of either cover was largely due to high germination rates in the uncovered control. The soil temperature in late April 2001 was sufficiently high to allow unimpeded germination.

Average germination rates portray a general picture of germination in covered and uncovered plots in each planting. Let us now examine the germination successes and failures of individual cultivars. In Tables 3 and 4, two benchmarks of germination were chosen to evaluate success or failure. The 75% benchmark (+) was chosen because it represents the germination standard for sweet corn published in the Federal Register (Anon 1994). Seed lots whose germination is below 75% cannot enter interstate commerce. Germination is tested under controlled laboratory conditions to establish the 75% benchmark. Under field conditions, however, the germination rate may fall below the standard. The 75% benchmark represents a rate that will normally produce a harvest that will exceed 1,600 dozen ears/acre 50% of the time. The second benchmark, the 90% germination rate (++), will produce a harvest of 1,600 dozen ears/acre 100% of the time. At this harvest rate, the total production costs, including clear plastic mulch or Reemay row covers, will be fully met with additional profit.

In 1999 at Windsor, despite low average germination rates of 59-68% in covered plots in both April plantings, several cultivars exceeded established benchmarks (Table 3). Germination of Majesty exceeded 90% not only under both covers in both plantings, but also the uncovered control in the April 21 planting. Under slit clear plastic mulch, germination of Fantasy, Jumpstart, Phenomenal, and Seneca Appaloosa exceeded 75% in both April plantings. Under Reemay row covers, the germination of Fantasy and Milk & Honey exceeded 75% in both plantings. Germination of Milk & Honey also attained 75% in both plantings in uncovered controls.

In 1999 at Mt. Carmel, average germination under clear plastic mulch exceeded 72% in both plantings. Germination of Majesty, Milk & Honey, and Phenomenal exceeded 90% in both plantings while Amazingly Sweet, Fantasy, and Seneca Appaloosa exceeded 75% in both plantings. Under Reemay, germination of Milk & Honey exceeded 90% in both plantings. Germination of Amazingly Sweet, Fantasy, and Majesty exceeded 75% in one of two plantings. Germination in the uncovered control was poor.

In summary, among all bicolor cultivars tested, Majesty and Milk & Honey were best-suited suited for April plantings under both covers while Phenomenal, Seneca Appaloosa, and Fantasy germinated well under clear plastic mulch. At both sites and in both plantings, germination of Diabolo, Honey & Pearl, Quest, and Twice as Nice failed to reach 75%. These cultivars are not cool soil tolerant and are ill-suited for April plantings under clear plastic mulch or Reemay row covers.

Table 3. Bicolor cultivars of supersweet corn exceeding 90%(++) and 75%(+) germination in April 21 (1) and April 29 (2) plantings on plots covered with clear plastic mulch, Reemay row covers, or uncovered controls at Windsor and Mt. Carmel in 1999.

| | Windsor | | | | | | Mt. Carmel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Clear Plastic Mulch | | Reemay Row Covers | | Uncovered Control | | Clear Plastic Mulch | | Reemay Row Covers | | Uncovered Control | |
| | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| Amazingly Sweet | + | - | + | - | - | - | ++ | + | + | - | + | - |
| Candy Store | + | - | - | - | - | - | + | - | - | - | - | - |
| Diabolo | - | - | - | - | - | - | - | - | - | - | - | - |
| Fantasy | + | + | + | + | + | - | + | + | ++ | - | - | + |
| Fortune | - | + | - | + | - | - | - | ++ | - | + | - | - |
| Honey & Pearl | - | - | - | - | - | - | - | - | - | - | - | - |
| Ivory & Gold | - | - | - | - | - | - | - | - | - | - | - | - |
| Jumpstart | + | + | - | - | - | + | + | + | - | - | - | - |
| Majesty | ++ | ++ | ++ | ++ | ++ | - | ++ | ++ | + | - | + | - |
| Milk & Honey | - | + | + | + | + | + | ++ | ++ | ++ | ++ | - | - |
| Odyssey | + | - | - | - | - | - | - | + | - | - | - | - |
| Phenomenal | + | + | - | - | - | + | ++ | ++ | + | - | - | - |
| Quest | - | - | - | - | - | - | - | - | - | - | - | - |
| Seneca Appaloosa | + | + | + | - | + | - | + | + | + | - | - | - |
| Twice as Nice | - | - | - | - | - | - | - | - | - | - | - | - |
| Avg. Germination % | 61 | 68 | 59 | 60 | 50 | 52 | 78 | 72 | 57 | 48 | 51 | 43 |

Table 4. Yellow cultivars of supersweet corn exceeding 90% (++) and 75% (+) germination in April 26 planting on plots covered with clear plastic mulch, Reemay row covers, or uncovered control at Windsor in 2001.

| | Clear Plastic Mulch | Reemay Row Covers | Uncovered Control |
|---|---|---|---|
| Early Illini Xtra Sweet | - | + | + |
| Extra Tender 275A | + | ++ | + |
| Fortune | - | ++ | + |
| Krispy King | - | ++ | ++ |
| Summer Sweet 6800 | + | ++ | ++ |
| Sweetie | + | ++ | ++ |
| Average germination % | 74 | 91 | 87 |

In 2001, all yellow supersweet corn cultivars germinated well under Reemay row covers (Table 4). Extra Tender 275A, Summer Sweet 6800, and Sweetie germinated satisfactorily under clear plastic mulch despite the initial lack of slits to vent excess heat. All cultivars germinated well in the uncovered control, which indicated that the soil temperature was already high enough in late April to permit germination.

*Days to maturity.* Days to maturity is defined as the number of days between the planting date and the median harvest date when half of the ears were harvested. This parameter is important to estimate the date of the first harvest. The maturity information supplied by the seedsmen are general estimates from data gathered from a broad geographical area and under optimum growing conditions. The best use of this information is to determine the relative maturities among cultivars offered in their catalogues. Maturity in a single crop depends on seasonal differences in temperature, moisture supply, and day length. Looking at the array of 14 cultivars tested for cool soil germination in 1999, first harvest of Windsor, Crop 1, began on July 13 and concluded on July 23, a span of 10 days. First harvest of Crop 2 began on July 23 and concluded on July 30, a span of 7 days. The overlap between Crop 1 and Crop 2 was one day (July 23). For commercial production, this short overlap between successive plantings is ideal. In Crop 1 at Mt. Carmel, first harvest began on July 14 and concluded on July 28, a span of 14 days. In Crop 2, first harvest began on July 22 and concluded on August 2, a span of 11 days. The overlap between Crop 1 and Crop 2 at Mt. Carmel was 6 days (July 22-July 28). For commercial production, this 6-day overlap between successive plantings may cause a bunching of yield and a loss of income. One advantage of supersweet corn, however, is its ability to be refrigerated up to 10 days after harvest with little loss of quality.

What effect did warming temperatures and increasing day length have on the average maturity of the 14 cultivars tested? In Crop 1 at Windsor, the average maturity of all cultivars was 13 days longer than those listed in commercial catalogues (Table 5). In Crop 2 at Windsor, the average maturity was 11 days longer. In Crop 1 at Mt. Carmel, the average maturity of all cultivars was 11 days longer than those listed in commercial catalogues. In Crop 2 at Mt. Carmel, the average maturity was 9 days longer. Thus, at both sites, maturity shortened 2 days in successive plantings 1 week apart in late April.

What effect did row covers have on maturity compared to uncovered controls? Earlier germination in Crop 1 and Crop 2 at Windsor covered with clear plastic mulch or Reemay row covers did not produce earlier harvests. In Crop 1 at Mt. Carmel, 7 of 14 cultivars under clear plastic mulch matured 3-7 days earlier than those in uncovered controls. Reemay row covers hastened maturity 3-4 days in 4 of 14 cultivars compared to uncovered controls. There was no effect of either cover in maturity of Crop 2 at Mt. Carmel.

Table 6. Days to maturity in April 26 plantings of yellow supersweet cultivars grown at Windsor-2001. Numbers in the second column are average maturities in plots covered with clear plastic mulch, Reemay row covers, and uncovered control.

| Cultivar | Catalogue Maturity Days | Avg. Maturity Days |
|---|---|---|
| Summer Sweet 6800 | 72 | 83 |
| Fortune | 73 | 90 |
| Extra Tender 275A | 75 | 92 |
| Early Illini Xtra Sweet | 78 | 90 |
| Krispy King | 78 | 92 |
| Sweetie | 82 | 93 |
| Average maturity | 76 | 90 |

In 2001 at Windsor, harvest of yellow supersweet corn from the germination trials began July 13 and concluded August 3, a span of 20 days. Similar to bicolor supersweet corn in April plantings, cool soil temperatures and less than maximum daylength slowed maturity of all cultivars compared to catalogue maturities. The average of six cultivars was 90 days, 14 days longer than the average catalogue maturity (Table 6). The effect of clear plastic mulch and Reemay row covers on maturity of most cultivars was negligible. In fact, maturity of Fortune, Krispy King, and Sweetie was delayed 3-7 days compared to maturities in the uncovered control. The build-up of heat under the unslit clear plastic mulch not only decreased germination but also slowed the early growth of the surviving seedlings. After the plastic was slit by hand after 8 days and removed after 18 days, the seedlings slowly recovered.

## CULTIVAR EVALUATION

In 1999, 2000, and 2001, yield and quality of ears from 14 bicolor cultivars and six yellow cultivars were evaluated in four plantings at Windsor.

*Ear characteristic—bicolor cultivars.* Among the six bicolor cultivars tested in 1999, Amazingly Sweet (10.7 ounces) and Phenomenal (9.8 ounces) had the heaviest ears (Table 7). The heavy weight of Amazingly Sweet was due to the greatest median number of rows of kernels (18). In fact, 38% of the ears had 20-24 rows of kernels. The relatively lighter and smaller ears of Seneca Appaloosa and Majesty were due to a greater number of competing ears/plant (1.5) compared to others (Table 7). Fully, 80% of Seneca Appaloosa plants had two marketable ears and 50% of

Table 7. Characteristics of bicolor and yellow supersweet corn grown at Windsor 1999-2001.

| | Avg. Weight* Oz. | Avg. Length* In. | Median Rows No. |
|---|---|---|---|
| BICOLOR 1999 | | | |
| Amazingly Sweet | 10.7a | 7.1a | 18 |
| Fantasy | 7.5ab | 6.8a | 14 |
| Jumpstart | 7.8ab | 7.6a | 14 |
| Majesty | 7.0b | 7.2a | 16 |
| Phenomenal | 9.8ab | 7.1a | 16 |
| Seneca Appaloosa | 7.6ab | 7.0a | 16 |
| BICOLOR 2000-CROP 1 | | | |
| Candy Store | 8.7ab | 7.3a | 18 |
| Odyssey | 8.2ab | 6.8a | 18 |
| Quest | 9.4a | 7.1a | 16 |
| Twice as Nice | 7.8b | 6.8a | 16 |
| BICOLOR 2000-CROP 2 | | | |
| Diabolo | 8.8ab | 7.2a | 18 |
| Fortune | 7.4b | 7.3a | 16 |
| Honey & Pearl | 8.8ab | 7.3a | 18 |
| Milk & Honey | 10.0a | 7.8a | 16 |
| YELLOW-2001 | | | |
| Early Illini Xtra Sweet | 9.7a | 7.7a | 16 |
| Extra Tender 275A | 8.0a | 7.0a | 18 |
| Fortune | 6.7b | 7.2a | 16 |
| Krispy King | 9.7a | 7.6a | 18 |
| Summer Sweet 6800 | 9.7a | 7.6a | 16 |
| Sweetie | 8.9a | 7.0a | 18 |

* Mean separation within columns by Tukey's HSD multiple comparison test at P=0.05. Values in columns followed by the same letter within each crop did not differ significantly.

Majesty had two marketable ears. Jumpstart had the longest ears (7.5 inches) and the fewest number of rows of kernels. Forty percent of Jumpstart ears were slender with only 12 rows of kernels.

In 2000, among the eight bicolor cultivars tested in Crop 1 and Crop 2, Milk & Honey (10.0 ounces) and Quest (9.4 ounces) had the heaviest ears (Table 7). The heavy weight of Milk & Honey was due to its greatest length among all cultivars. The ear weights of Candy Store, Odyssey, Diabolo, and Honey & Pearl were above average due to their greater median rows of kernels (18).

*Ear characteristics—yellow cultivars.* In 2001, among the six yellow cultivars tested, ears of Early Illini Xtra Sweet, Krispy King, and Summer Sweet 6800 were heaviest (9.7 ounces). The heavy weight of Early Illini Xtra Sweet was due to greatest length (7.7 inches) among all cultivars. Krispy King and Summer Sweet 6800 had above-average length (7.6 inches) and median number of rows of kernels was 18 and 16, respectively (Table 7). Fortune had the lightest ears (6.7 ounces) because its length (7.2 inches) and median number of rows (16) were below average.

*Grades—bicolor cultivars.* In 1999, ears of the six cultivars averaged 78% Grade 1, 18% Grade 2, and 4% Grade 3 (Table 8). Grade 1 ears of Seneca Appaloosa and Phenomenal exceeded 90%. Grade 2 ears of Jumpstart (35%), Amazingly Sweet (23%), and Fantasy (22%) displayed incomplete tip fill. In 2000 Crop 1, ears of all four cultivars averaged 97% Grade 1. All ears (40) of Odyssey and Quest were perfectly formed. The high percentage of Grade 1 in this planting indicated that the conditions of moisture and wind for transfer of pollen from tassel to silk were ideal.

In 2000 Crop 2, ears of four cultivars averaged 66% Grade 1, 32% Grade 2, and 2% Grade 3 (Table 8). Most Grade 2 ears in all cultivars had incomplete tip fill exceeding 1 inch from the tip. The number of Grade 1 ears of Diabolo was greatest (80%) and least for Milk & Honey (42%). It was obvious that conditions during pollination were not as ideal as in Crop 1. Examination of weather records revealed that the last 2 weeks of August, when pollination was likely to occur, were very dry (0.2 inches of rain). Pollination is often incomplete when plants are under moisture stress (Yamaguchi 1983). In contrast, in the first 2 weeks of August when pollination occurred in Crop 1, moisture supplies were adequate (2.1 inches of rain), and the plants were not stressed.

*Grades—yellow cultivars.* In 2001, ears of six cultivars averaged 93% Grade 1, 5% Grade 2, and 2% Grade 3 (Table 8). All 40 ears of Krispy King were Grade 1 while ears of Early Illini Xtra Sweet, Extra Tender 275A, and Summer Sweet 6800 exceeded 90% Grade 1. Twelve percent of Fortune's ears displayed incomplete tip fill. The period of pollination (mid-August) for this crop was characterized by abundant rainfall (3.2 inches).

In summary, Table 8 showed that percentages of Grade 1 varied among cultivars within a planting but the general completeness of pollination of the crop as a whole was controlled by environmental conditions at the time of pollination. Successful pollination of all cultivars occurred in 2000 Crop 1 and in 2001, less in 1999, and least in 2000 Crop 2.

*Germination and yield—bicolor cultivars.* In 1999, average germination among the six bicolor cultivars was 82% (Table 9). Germination of Majesty was greatest (88%) and Fantasy was least (74%). In 2000 Crop 1, average germination among the four cultivars was 80%. Germination of Odyssey was greatest (91%) and Twice as Nice was least (63%). In 2000 Crop 2, average germination among four

Table 8. Distribution by grade of bicolor and yellow supersweet corn grown at Windsor 1999-2001.

| | Grade 1 % | Grade 2 % | Grade 3 % |
|---|---|---|---|
| BICOLOR 1999 | | | |
| Amazingly Sweet | 72 | 23 | 5 |
| Fantasy | 68 | 22 | 10 |
| Jumpstart | 55 | 35 | 10 |
| Majesty | 85 | 15 | 0 |
| Phenomenal | 90 | 8 | 2 |
| Seneca Appaloosa | 95 | 5 | 0 |
| BICOLOR 2000-CROP 1 | | | |
| Candy Store | 92 | 5 | 3 |
| Odyssey | 100 | 0 | 0 |
| Quest | 100 | 0 | 0 |
| Twice as Nice | 98 | 2 | 0 |
| BICOLOR 2000-CROP 2 | | | |
| Diabolo | 80 | 20 | 0 |
| Fortune | 72 | 23 | 5 |
| Honey & Pearl | 68 | 30 | 2 |
| Milk & Honey | 42 | 53 | 5 |
| YELLOW 2001 | | | |
| Early Illini Xtra Sweet | 93 | 5 | 2 |
| Extra Tender 275A | 95 | 3 | 2 |
| Fortune | 85 | 12 | 3 |
| Krispy King | 100 | 0 | 0 |
| Summer Sweet 6800 | 95 | 5 | 0 |
| Sweetie | 88 | 5 | 7 |

cultivars was 62%. Germination of Fortune and Milk & Honey exceeded 80%.

In 1999, marketable ears/plant was highly variable (Table 9). Seneca Appaloosa produced the most ears/plant (1.8) while Fantasy produced the least (0.4), i.e. 80% of Seneca Appaloosa plants produced two marketable ears while Fantasy produced one marketable ear in 40% of plants. Normally supersweet corn plants produce two ears/plant, but some ears fail to reach marketable size (greater than 6 inches). Short ears are usually offered for sale at a considerable discount from prevailing retail prices.

In 2000, among the eight bicolor cultivars planted in Crop 1 and Crop 2, Candy Store and Quest had the most marketable ears/plant (1.5). Fifty percent of their plants produced two marketable ears.

Total yield/acre was estimated by multiplying 17,430 plants/acre (spacing of 36 inches by 10 inches) X ears/plant X % germination. In 1999, Seneca Appaloosa and Majesty had yields exceeding 23,000 ears/acre (Table 9). High yield of Majesty was due to its high germination rate and Seneca Appaloosa was due to high number of ears/plant. In contrast, cultivars with low estimated yield was due to poor germination or to a high number of plants producing one ear or less.

In 2000 Crop 1, total estimated yield of Candy Store, Odyssey, and Quest exceeded 24,500 ears/acre. Candy Store and Odyssey had high germination rates and a high number of plants producing two ears.

In 2000 Crop 2, only Fortune produced nearly 21,000 ears/acre. Its high yield was due to a high germination rate and 20% of plants producing two ears. Although germination of Milk & Honey exceeded 80%, only 90% of plants produced one marketable ear.

*Germination and yield—yellow cultivars.* In 2001, average germination among the six cultivars was 84% (Table 9). Germination of Fortune was greatest (95%) and least in Summer Sweet 6800 (82%). Fortune and Summer Sweet 6800 produced the most marketable ears/plant while Extra Tender 275A produced the least (0.9). The estimated marketable yield of Fortune was greatest (26,500 ears/acre) Its high germination rate and greatest number of ears/plant (1.6) assured its high yield. Sweetie, Summer Sweet 6800, and Early Illini Xtra Sweet also produced estimated yields exceeding 20,000 ears/acre. All had germination rates exceeding 80% with 30-50% of plants producing two marketable ears.

*Maturity.* The maturity of the 14 bicolor cultivars varied between 69 and 77 days (Table 9). The average maturity was 78 days compared to 77 days reported in catalogues. Crops maturing in August closely resemble catalogue maturities. We saw earlier that crops planted in April matured several days later than expected because soil temperatures were cooler and daylength had not reached its maximum.

The maturity of six yellow cultivars varied between 66 and 77 days. The average maturity was 71 days compared to 76 days reported in catalogues, a difference of 5 days. Krispy King matured 8 days earlier than expected.

## MANAGEMENT

*Cultivar selection.* In selecting suitable cultivars for a sweet corn program, one must consider yield potential, quality characteristics that appeal to sight and taste, and their response to temperature modification by cover materials to produce early crops that are the most profitable. When harvested at full maturity, (generally 21 days after silk appears on half the plants), bicolor and yellow supersweet corn maintains satisfactory sweetness 8-10 days under

Table 9. Germination, yield, and days to maturity of bicolor and yellow supersweet corn grown at Windsor for ear evaluation, 1999-2001.

| | Germination | Marketable Ears/Plant | Estimated Total Yield | | Maturity |
|---|---|---|---|---|---|
| | % | No. | Ears/A | Doz./A | Days |
| BICOLOR 1999 (PLANTED JUNE 30) | | | | | |
| Amazingly Sweet | 83 | 0.8 | 14,465 | 1,205 | 76 |
| Fantasy | 74 | 0.4 | 4,760 | 397 | 75 |
| Jumpstart | 80 | 1.1 | 15,340 | 1,278 | 69 |
| Majesty | 88 | 1.5 | 23,180 | 1,932 | 75 |
| Phenomenal | 82 | 1.2 | 16,940 | 1,412 | 76 |
| Seneca Appaloosa | 82 | 1.8 | 25,010 | 2,084 | 69 |
| BICOLOR 2000 - CROP 1 (PLANTED JUNE 23) | | | | | |
| Candy Store | 88 | 1.5 | 28,685 | 2,390 | 77 |
| Odyssey | 91 | 1.3 | 26,560 | 2,213 | 75 |
| Quest | 76 | 1.5 | 24,560 | 2,047 | 77 |
| Twice as Nice | 63 | 1.2 | 16,960 | 1,413 | 77 |
| BICOLOR 2000 - CROP 2 (PLANTED JULY 7) | | | | | |
| Diabolo | 34 | 1.2 | 9,290 | 774 | 76 |
| Fortune | 82 | 1.2 | 20,970 | 1,748 | 76 |
| Honey & Pearl | 50 | 1.1 | 11,615 | 968 | 76 |
| Milk & Honey | 80 | 0.9 | 15,660 | 1,305 | 74 |
| YELLOW 2001 (PLANTED JUNE 26) | | | | | |
| Early Illini Xtra Sweet | 89 | 1.3 | 20,165 | 1,680 | 73 |
| Extra Tender 275A | 64 | 0.9 | 10,040 | 837 | 70 |
| Fortune | 95 | 1.6 | 26,500 | 2,208 | 70 |
| Krispy King | 84 | 1.0 | 14,640 | 1,220 | 70 |
| Summer Sweet 6800 | 82 | 1.5 | 21,440 | 1,786 | 66 |
| Sweetie | 88 | 1.4 | 21,475 | 1,789 | 77 |

refrigeration and 4-5 days at room temperature. Harvest could be delayed 5-7 days following full maturity without loss of quality. Delayed harvest, however, shortens the shelf life and exposes the mature crop to damage by raccoons, skunks, and birds. No cultivars tested displayed tough pericarps, an objection noted in many early cultivars of supersweet corn (Wong et al. 1994).

For late-April plantings, bicolor cultivars that responded well to temperature modification by clear plastic mulch were Phenomenal, Jumpstart, Amazingly Sweet, Majesty, and Seneca Appaloosa. Those that responded well to Reemay row covers were Majesty, Phenomenal, Seneca Appaloosa, and Jumpstart (Table 10). Majesty and Phenomenal had consistently high germination rates at both sites under both covers and produced yields exceeding 1,600 dozen ears/acre in four of four plantings. Seneca Appaloosa had high germination rates at both sites, especially under clear plastic mulch, and yields exceeded 1,600 dozen ears/acre in three of four plantings. In two plantings of Phenomenal at Windsor, yields exceeded 2,200 dozen ears/acre by virtue of a high number of ears/plant (1.8 and 2.2).

For late-April plantings, yellow cultivars that responded well to temperature modification under clear plastic mulch were Fortune and Early Illini Xtra Sweet (Table 10). Although germination rates were low (55% and 50%, respectively), the average number of ears/plant (1.6 and 1.7, respectively) compensated to produce estimated yields of 1,310 and 1,220 dozen ears/acre, respectively.

Yellow cultivars that responded well to temperature modification under Reemay row covers were Fortune and Sweetie (Table 10). High germination rates (92% and 88%, respectively) combined with high number of ears/plant, 1.4 and 1.7, respectively, produced estimated yields of 2,300 dozen ears/acre. Early Illini Xtra Sweet and Extra Tender 275A also had estimated yields exceeding 1,600 dozen ears/acre.

Table 10. Yield and estimated net profit or (loss)/acre (dollars gross returns less total cost) of bicolor and yellow supersweet corn in late April plantings at a retail price of $3.00/dozen ears and a wholesale price of $1.50/dozen ears.

| | Estimated Yield/A Dozen | | | Retail at $3.00/doz. Dollars/acre | | | Wholesale at $1.50/doz. Dollars/acre | | |
|---|---|---|---|---|---|---|---|---|---|
| | Clear Plastic | Reemay | No Cover | Clear Plastic | Reemay | No Cover | Clear Plastic | Reemay | No Cover |
| BICOLOR (AVG. OF TWO PLANTINGS AT TWO SITES) | | | | | | | | | |
| Amazingly Sweet | 1744 | 1511 | 1569 | 3807 | 2508 | 4082 | 1191 | 242 | 1728 |
| Candy Store | 1278 | 1506 | 695 | 2409 | 2493 | 1460 | 492 | 234 | 418 |
| Diabolo | 1281 | 873 | 464 | 2418 | 594 | 767 | 496 | (716) | 71 |
| Fantasy | 1511 | 817 | 754 | 3108 | 426 | 1637 | 842 | (780) | 506 |
| Fortune | 1106 | 697 | 930 | 1893 | 66 | 2165 | 234 | (980) | 770 |
| Honey & Pearl | 582 | 1329 | 116 | 321 | 1962 | (277) | (552) | (32) | (451) |
| Jumpstart | 1801 | 1679 | 2035 | 3978 | 3012 | 5480 | 1276 | 494 | 2428 |
| Majesty | 1687 | 2552 | 2440 | 3636 | 5531 | 6695 | 1106 | 1803 | 3035 |
| Milk & Honey | 1106 | 1391 | 1457 | 1893 | 2148 | 3746 | 234 | 62 | 1560 |
| Odyssey | 1214 | 1339 | 1224 | 2217 | 1992 | 3047 | 396 | (16) | 1211 |
| Phenomenal | 2209 | 2269 | 2035 | 5202 | 4782 | 5480 | 1888 | 1378 | 2428 |
| Quest | 988 | 1046 | 813 | 1539 | 1113 | 1814 | 57 | (456) | 594 |
| Seneca Appaloosa | 1684 | 1859 | 2032 | 3627 | 3552 | 5471 | 1101 | 764 | 2423 |
| Twice as Nice | 523 | 464 | - | 144 | (633) | - | (640) | (1329) | - |
| YELLOW (AVG. OF TWO PLANTINGS AT ONE SITE) | | | | | | | | | |
| Early Illini Xtra Sweet | 1221 | 1628 | 1538 | 2238 | 2859 | 3989 | 406 | 417 | 1682 |
| Extra Tender 275A | 783 | 1686 | 1424 | 924 | 3033 | 3647 | (250) | 504 | 1511 |
| Fortune | 1306 | 2301 | 2123 | 2493 | 4878 | 5744 | 534 | 1426 | 2560 |
| Krispy King | 640 | 1369 | 1482 | 495 | 2082 | 3821 | (456) | 28 | 1598 |
| Summer Sweet 6800 | 783 | 1512 | 1716 | 924 | 2511 | 4523 | (250) | 243 | 1949 |
| Sweetie | 930 | 2296 | 2178 | 1365 | 4863 | 5905 | (30) | 1419 | 2642 |

For mid-May to early-June plantings of bicolor cultivars without cover, Majesty, Seneca Appaloosa, Candy Store, Fortune, Odyssey, and Quest produced yields exceeding 1,600 dozen ears/acre. Yellow cultivars producing yields exceeding 1,600 dozen ears/acre were Fortune, Summer Sweet 6800, Sweetie, and Early Illini Xtra Sweet.

*Crop covers.* Clear plastic mulch and Reemay row covers are often used to produce early harvest of sweet corn (Ferro et al. 1997). Both covers increased soil temperatures, speeded germination, and increased percent germination. Clear plastic, however, must be slit to allow escape of excess heat that might kill emerging seedlings. The covers must ultimately be removed to allow cultivation for weed control (if herbicides are not used) and sidedressing of fertilizer. Compared to slit clear plastic, Reemay row covers increased soil temperatures to a lesser degree but allowed excess heat to escape and rainfall to readily penetrate the cover. Clear plastic mulch and Reemay row covers create additional expense. To be economically beneficial, a cover should provide additional income to offset the cost of the material and labor to install and remove it, or it should provide earlier harvest when the price of locally produced sweet corn is highest. The cost of producing an early crop of supersweet corn without clear plastic mulch or Reemay row cover is estimated to be $625/acre. At 2001 prices, the cost of 1.1 mil slit clear plastic and Reemay row cover are $650/acre and $1,250/acre, respectively, plus $150/acre for installation and removal. Thus, total production cost would be $1425/acre for slit clear plastic mulch and $2,025/acre for Reemay row cover (Hill 1998). At an estimated price of $3.00/dozen ears retail at roadside stands for early-harvested supersweet corn, the break-even yield would be 203 dozen ears/acre for no cover, 475 dozen ears/acre for slit clear plastic mulch, and 675 dozen ears/acre for Reemay row covers. The break-even yield at a wholesale price of $1.50/dozen ears would be 417 dozen ears/acre for no cover, 950 dozen ears/acre for slit clear plastic mulch, and 1,350 dozen ears/acre for Reemay row covers.

The yield of each cultivar in the cool soil germination tests was calculated for each planting at both sites. The estimated yield was based on a population of 17,430 plants/acre X average ears/plant X % germination for each treatment. The numbers for bicolor supersweet corn in Table 10 are averages of two plantings at two sites. For yellow supersweet corn, the numbers are averages of two plantings at one site.

For bicolor supersweet corn, clear plastic mulch increased yield in eight of 14 cultivars while Reemay row covers increased yield in seven of 14 cultivars compared to the uncovered control. For yellow supersweet corn, clear plastic mulch increased yield in zero of six cultivars while Reemay row covers increased yield in four of six cultivars, compared to the uncovered control. Failure of clear plastic mulch was due to the build-up of heat beneath the plastic. The plastic cover was slit after it became obvious the emerging seedlings were under severe stress. The average initial germination of the six cultivars was 75%, but after the plastic was removed in June, only 46% of the plants survived compared to 83% of plants in the uncovered control.

Although yield increases were observed in many bicolor cultivars under clear plastic and Reemay and most yellow cultivars under Reemay, were they great enough to offset the additional production cost? To determine profitability, the estimated yield/acre of each cultivar was multiplied by an estimated retail price of $3.00/dozen ears to obtain gross returns. Total production cost/acre ($1,425/acre for clear plastic mulch, $2,025/acre for Reemay row covers, and $625/acre without cover) was subtracted to determine the net profit or (loss)/acre (Table 10). It was assumed that all marketable ears were harvested and sold.

At a retail price of $3.00/dozen ears, greatest profit in bicolor cultivars was accrued in nine of 14 cultivars without cover, and two of 14 under clear plastic and Reemay row covers (Table 10). Apparently, most cultivars were well adapted to the cool soil temperatures in late-April plantings. The greatest net profit was observed in Majesty ($6,695/acre). Net profits exceeding $5,000/acre were also noted in Jumpstart, Phenomenal, and Seneca Appaloosa. Net profit in Majesty under Reemay and Phenomenal under clear plastic also exceeded $5,000/acre.

For the six yellow supersweet cultivars, net profit was greatest in all cultivars without cover. The increased yields noted in four of six cultivars were insufficient to offset the cost of the cover materials. Net profits exceeding $5,700/acre were observed in Fortune and Sweetie, grown without cover.

At a wholesale price of $1.50/dozen ears, lower net profit was realized for most bicolor cultivars. Only two of 14 cultivars had greater net profit under clear plastic mulch and zero of 14 cultivars under Reemay row covers. In fact seven of 14 cultivars grown under Reemay row covers incurred net losses. Seven of 14 cultivars showed a greater net profit with no cover compared to either cover. Majesty had the greatest net profit ($3,035/acre) without cover. Net profit of Jumpstart, Phenomenal, and Seneca Appaloosa without cover exceeded $2,400/acre.

All six yellow cultivars had greatest profit without cover. Four of six had a net loss when grown under clear plastic mulch. Net profit of Fortune and Sweetie exceeded $2,500/acre without cover.

How could net profit be increased? Increased yields could be attained by assuring that soil moisture is adequate for germination. Delay in planting until after a rain or irrigation after planting may increase stand density, yield, and profitability. Cost reduction could also be achieved if the cover materials could be salvaged and reused another year. In earlier corn trials (Hill 2000) Reemay row covers were reused 3 years with only 20% being replaced in the third year. Reemay row covers removed after germination was complete (3-4 weeks) showed little damage. Damage would have been greater if the row covers remained several weeks more as the plants grew and exerted pressure beneath the cover and exposed the cover to wind. The initial cost of Reemay, amortized over 3 years would substantially reduce costs and increase profitability. Reuse of 1.1 mil slit clear plastic is more difficult. Wind damage and the removal of the slit plastic with many plants protruding took its toll on longevity. Few strips could be used a second year.

*Planting dates.* From Table 10, it is obvious that most bicolor and yellow cultivars could be planted after April 23 without covers because soil temperature in 1999 and 2001 did not limit germination. From earlier studies (Hill 2000), succession plantings, 7 days apart, did not produce mature crops in a similar span of time. Some late-maturing cultivars in Crop 1 and early maturing cultivars in Crop 2 were harvested in mid-July because the maturity of the second crop shortened as the daily temperature increased and daylight increased to its maximum length. In 1999, there was an overlap of 6 days in the harvest of Crop 1 and Crop 2 at Windsor. To avoid bunching of harvests as the weather warms, scheduling of successive plantings using a growing degree-day system (Ashley 1997) has proven useful. For earliest harvests of crops grown under clear plastic mulch or Reemay row covers, early-to-mid-maturing cultivars are useful.

In early-July plantings for final harvest, cultivars with 65-75-day maturity are preferred. At this time, late-maturing cultivars (75+ days) may occasionally be injured by frost as they reach maturity. In the Eastern and Western Highlands, suitable temperatures for germination of supersweet corn may not occur until early June without the use of clear plastic mulch. In May, clear plastic mulch and Reemay row covers may increase germination and profit for roadside sales.

*Special requirements.* Plantings of supersweet corn have

special requirements. The shrunken seeds, smaller than normal (su) or sugar enhanced (se) types, should be planted 0.75 to 1.0 inch deep. Planted at greater depth, germination is poorer and subsequent yield may decrease. Planting in moist soil with temperatures greater than 60-65F increases germination. Some newly-released cultivars of supersweet corn with increased cool soil tolerance are usually identified in many seed catalogues.

Supersweet corn must be isolated from all other corn types to insure the development of maximum sugar content and flavor. Since corn is pollinated by wind, isolation can be accomplished by distance or maturity. Most seedsmen recommend a distance of 250 feet between plantings of supersweet corn and other corn types i.e. normal sugary (su), sugar enhanced (se), field, pop, and ornamental. Large plantings are best isolated by a distance of 500 feet, especially if the field is located downwind at windy sites with no tree breaks. Isolation by maturity can be accomplished by separation of 10-14 days between plantings of supersweet corn and other corn types. All white supersweet cultivars require isolation from bicolor and yellow cultivars to insure that the white recessive gene is fully expressed.

Bicolor and yellow supersweet cultivars usually develop numerous tillers (suckers) at the base of the stem. Occasionally large tillers produce marketable ears, hence, their removal may reduce yield (Yamaguchi 1983).

Finally, germination of seed treated with fungicides, produces a denser stand of plants, especially if germination is delayed by lack of soil moisture or excessively cool soil temperatures.

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